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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,761	08/28/2001	Koji Furusawa	NEC2480-US	3216

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EXAMINER

ORTIZ, EDGARDO

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 04/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/939,761

Applicant(s)
Furusawa

Examiner
Edgardo Ortiz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jan 24, 2003
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-21 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other: _____

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DETAILED ACTION

This Office Action is in response to an after non-final rejection response filed January 24, 2003.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7, 8, 12, 14, 15 and 17 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Takiar et.al. (U.S. Patent No. 5,502,289) in view of Shinohara (U.S. Patent No. 5,238,878). With regard to claims 7, 12, 15 and 17; Takiar teaches a substrate (142), a first semiconductor chip (136) on said substrate, a second semiconductor chip (140) overlying said first semiconductor chip, a wiring layer (138) between said first and second semiconductor chips, said wiring layer comprising a substrate material which is defined as including a conductor such as copper or aluminum and a dielectric such as a polyimide, a plurality of bonding pads on the wiring layer, the substrate and the first and second semiconductor chips and a plurality of bonding wires for connecting said plural bonding pads to each other, wherein said second semiconductor chip is mounted on the wiring layer by an adhesive material (88). See Figure 7.

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However, Takiar fails to show the wiring layer provided on the first semiconductor chip without using an adhesive material. Shinohara discloses a film forming method by spin coating for a semiconductor device, wherein a polyimide precursor is provided as a film forming solution onto a semiconductor substrate. Therefore, it would have been an obvious modification to someone with ordinary skill in the art, at the time of the invention, to modify the structure as taught by Takiar to provide a wiring layer comprising a dielectric such as a polyimide on the first semiconductor chip by a spin coating method, as clearly suggested by Shinohara, in order to reduce the size of the semiconductor chip package, since there is no need for an additional adhesive between the first semiconductor chip and the wiring layer.

With regard to Claims 8 and 14, Takiar teaches a first bonding wire that connects one of said plural bonding pads on the substrate (142) to one of the plural bonding pads on the first semiconductor chip (136), a second bonding wire that connects one of the plural bonding pads on the substrate to one of the plural bonding pads on the wiring layer (138) and a third bonding wire that connects one of the plural bonding pads on the wiring layer to one of the plural bonding pads on the substrate.

Claims 9, 13 and 19 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Takiar et.al. (U.S. Patent No. 5,502,289) in view of Shinohara (U.S. Patent No. 5,238,878) and further in view of Beilstein, Jr. et.al. (U.S. Patent No. 5,567,654). Takiar and Shinohara, as stated supra,

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essentially discloses the claimed invention but fail to show, a connection wire for connecting one of the plural bonding pads on the wiring layer to another one of the plural bonding pads on the wiring layer. With regard to Claims 9, 13 and 19; Beilstein teaches an electronic module package that includes an interposer layer (95), comprising a ceramic, having wiring (97) within the interposer and connected to pads (89). Therefore, it would have been an obvious modification to someone with ordinary skill in the art, at the time of the invention, to modify the structure as taught by Takiar and Shinohara, to include a connection wire for connecting one of the plural bonding pads on the wiring layer to another one of the plural bonding pads on the wiring layer, as clearly suggested by Bielstein, in order to connect the electronic package to external circuitry or lead frame connections.

Claims 10, 11, 16, 18 and 20 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Takiar et.al. (U.S. Patent No. 5,502,289) in view of Shinohara (U.S. Patent No. 5,238,878) and further in view of Tokuda et.al. (U.S. Patent No. 5,870,289). Takiar and Shinohara, as stated supra, essentially discloses the claimed invention but fail to show, a via hole on the wiring layer and connected to a bonding pad of a semiconductor chip. With regard to Claims 10, 11, 16, 18 and 20, Tokuda teaches a chip connection structure having a direct through-hole connection (40) through a wiring layer (20) which connects to a bonding pad (11) of an integrated circuit chip (10). Therefore, it would have been an obvious modification to someone with ordinary skill in the art, at the time of the invention, to modify the structure as taught by Takiar and Shinohara, to

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include a via hole on the wiring layer and connected to a bonding pad of a semiconductor chip, as clearly suggested by Tokuda, in order to achieve high signal transmission and ensure high reliability by the dispersion of stress.

Claim 21 is rejected under 35 U.S.C. § 103 (a) as being unpatentable over Takiar et.al. (U.S. Patent No. 5,502,289) in view of Shinohara (U.S. Patent No. 5,238,878) and further in view of Tokuda et.al. (U.S. Patent No. 5,870,289) and Beilstein, Jr. et.al. (U.S. Patent No. 5,567,654). Takiar, Shinohara and Tokuda, as stated supra, essentially disclose the claimed invention but fail to show, a connection wire for connecting one of the plural bonding pads on the wiring layer to another one of the plural bonding pads on the wiring layer. With regard to Claim 21, Beilstein teaches an electronic module package that includes an interposer layer (95), comprising a ceramic, having wiring (97) within the interposer and connected to pads (89). Therefore, it would have been an obvious modification to someone with ordinary skill in the art, at the time of the invention, to modify the structure as taught by Takiar, Shinohara and Tokuda to include a connection wire for connecting one of the plural bonding pads on the wiring layer to another one of the plural bonding pads on the wiring layer, as clearly suggested by Beilstein, in order to connect the electronic package to external circuitry or lead frame connections.

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Response to Arguments

2. Applicant's arguments with respect to claims 7-21 have been considered but are not deemed persuasive for the reasons stated in the body of the office action. Applicant argues, regarding the rejection of claims 7, 8, 12, 14, 15 and 17 that "TAKIAR et.al. Teach either a metal such as aluminum or a dielectric plastic circuit board material such as polyimide but do not teach or suggest that the substrate material includes both the metal and the dielectric as indicated in the Official Action. The examiner disagrees and notes that as clearly stated in Takiar on column 4, lines 47-52, the substrate material maybe used as an interconnect material and "may be, *but is not limited to*, ceramic, metal, silicon or a plastic circuit board material (PCB)". Therefore, the teaching of a "wiring layer comprising a substrate material which is defined as including a conductor such as copper or aluminum and a dielectric such as a polyimide" is clearly suggested by the reference. Applicant further argues, regarding the Shinohara reference, that "the motivation provided in the Official Action is not supported by the reference". The examiner notes that Shinohara clearly suggests providing a wiring layer comprising a dielectric such as a polyimide on the first semiconductor chip by a spin coating method, which reduces the size of the semiconductor chip package, since there is no need for an additional adhesive between the first semiconductor chip and the wiring layer, because the wiring layer comprising the polyimide can be formed directly on the substrate. Applicant also argues that "Shinohara does not teach or suggest a copper foil layer within the polimide layer". It is noted that Shinohara was not cited for this particular teaching and is directed to Takiar, which teaches a substrate material maybe used as

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an interconnect material that may be, but is not limited to, ceramic, metal, silicon or a plastic circuit board material (PCB). Additionally, it is noted that the test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art and that references are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. Applicant arguments regarding the rejection of claims 7-13, 16, 18 and 20 rely on the arguments presented for claims 7, 8, 12, 14, 15 and 17 and thus have been addressed as presented above.

Conclusion

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Edgardo Ortiz (Art Unit 2815), whose telephone number is (703) 308-6183 or by fax at (703) 308-7722. In case the Examiner can not be reached, you might call Supervisor Eddie Lee at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application should be directed to the Group 2800 receptionist whose telephone number is (703) 308-0956.

EO/AU 2815

3/27/03



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